A Re-Interpretation of the Sand-Pipes Described by ADEGOKE

BY

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(Plate 17)

ADEGOKE (1966) DESCRIBED A NUMBER of silicified sand and mud-filled pholad burrows in Upper Miocene strata from San Luis Obispo County, California. The rock into which the burrows were bored belongs to the Monterey Formation and is described by ADEGOKE as a "hard, dull, greenish-brown, siliceous and cherty mudstone." The Monterey Formation is overlain by a "whitish-gray, fine-grained and tuffaceous silty sandstone" of the Pismo Formation, which fills the burrows, forming the "sand-pipes."

As I have recently been engaged in the study of the ecology of living pholads, I would like to discuss his findings and to offer some alternative interpretations.

ADEGOKE tentatively assigned the fossil pholad to the genus *Chaceia* (?). While on the available evidence this identification cannot be ruled out, it should be pointed out that the characters used to identify the genus are not definitive.

One of the principal characters used was the short sub-spherical outline of the valves. Unfortunately, ADEGOKE does not give a numerical value for the ratio: valve length to depth. Measurements made by TURNER (1955) show that adult *Chaceia ovoidea* (GOULD, 1851) with a length to depth ratio range of 1.46 - 1.88 could be confused with a number of the Pacific Coast pholads on the basis of this character. This is especially true of *Penitella fitchi* TURNER, 1955, with a ratio ranging from 1.1 to 1.9 and *Zirfaea pilsbryi* LOWE, 1931, with ratios from 1.5 to 2.1 (TURNER, 1954). In the vicinity of Coos Bay, Oregon, adult *Penitella penita* (CONRAD, 1837) have been collected by the author with a length to depth ratio ranging from 1.55 to 2.56. Young, actively boring animals are significantly shorter than the adults, with the ratio ranging all the way down to 1.0 in the newly settled forms.

Another character used by ADEGOKE to identify *Chaceia* was the thinness of the walls of the valves. Because valve thickness is a highly variable characteristic even within a single species, it is not a useful characteristic for identifying pholad genera. The valve thickness of *Penitella penita* varies from very thin in soft rock to very thick in hard rock (EVANS: A, in press).

The presence of a pedal gape is characteristic of all young Pholadidae. The callum which partially or wholly closes the pedal gape of adult Martesiinae is usually very delicate and is the first portion of the shell to dissolve or break after death. Thus the numerous holes in the anterior region of the burrows could either be explained by the absence of a callum or by a broken callum.

The observation that "the faint lamellar ribs are not unlike those of *Chaceia*" does not help to identify the fossils because the lamellar ribs of all Martesiinae are basically very similar. On the other hand, within a single species (*Penitella penita*) the morphology of the lamellar ribs can vary considerably depending on the type of substrate inhabited by the animal (EVANS: A, in press and B, in preparation).

ADEGOKE described two types of burrows: elongate conical burrows with tapering necks and bulbous bottoms (similar to Figure 1, Plate 17) and small spherical burrows with or without short slender necks (similar to Figure 2, Plate 17).

Most pholads drill conical burrows, similar to the first type. With the present state of our knowledge about pholad

Explanation of Plate 17

Figure 1: *Penitella penita* valves and cast of burrow
Figure 2: *Nettastomella rostrata* valves and cast of burrow
Note: Base of burrow incomplete in both cases

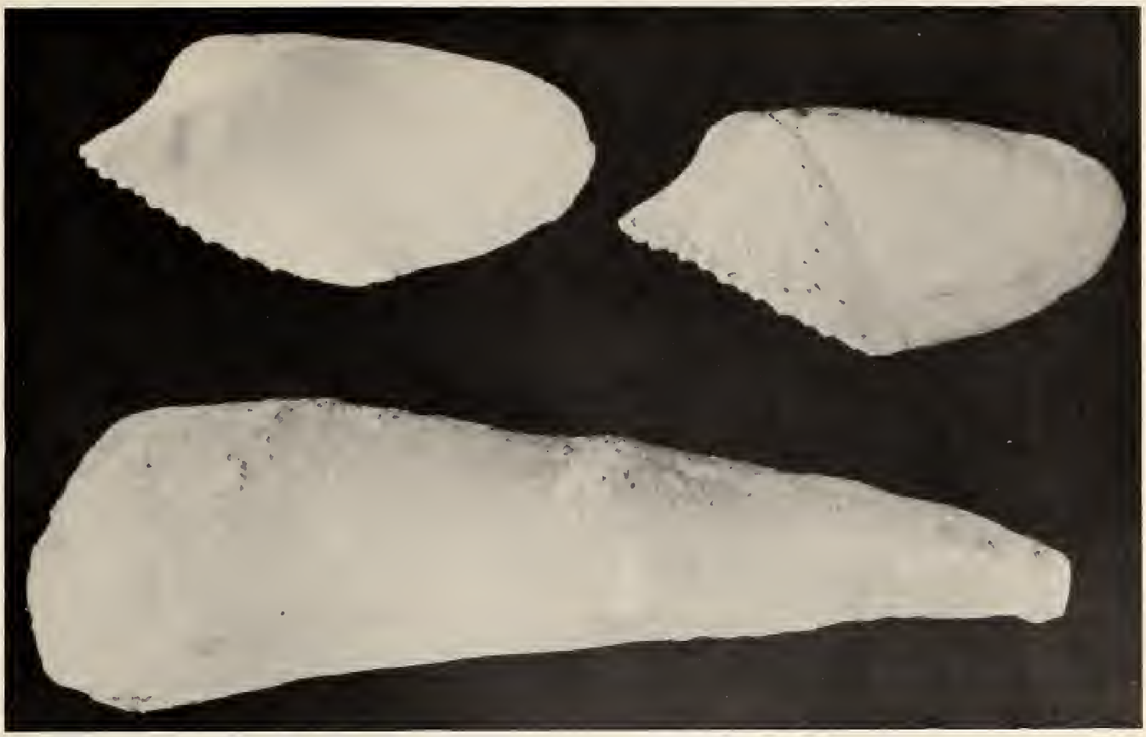

Figure 1

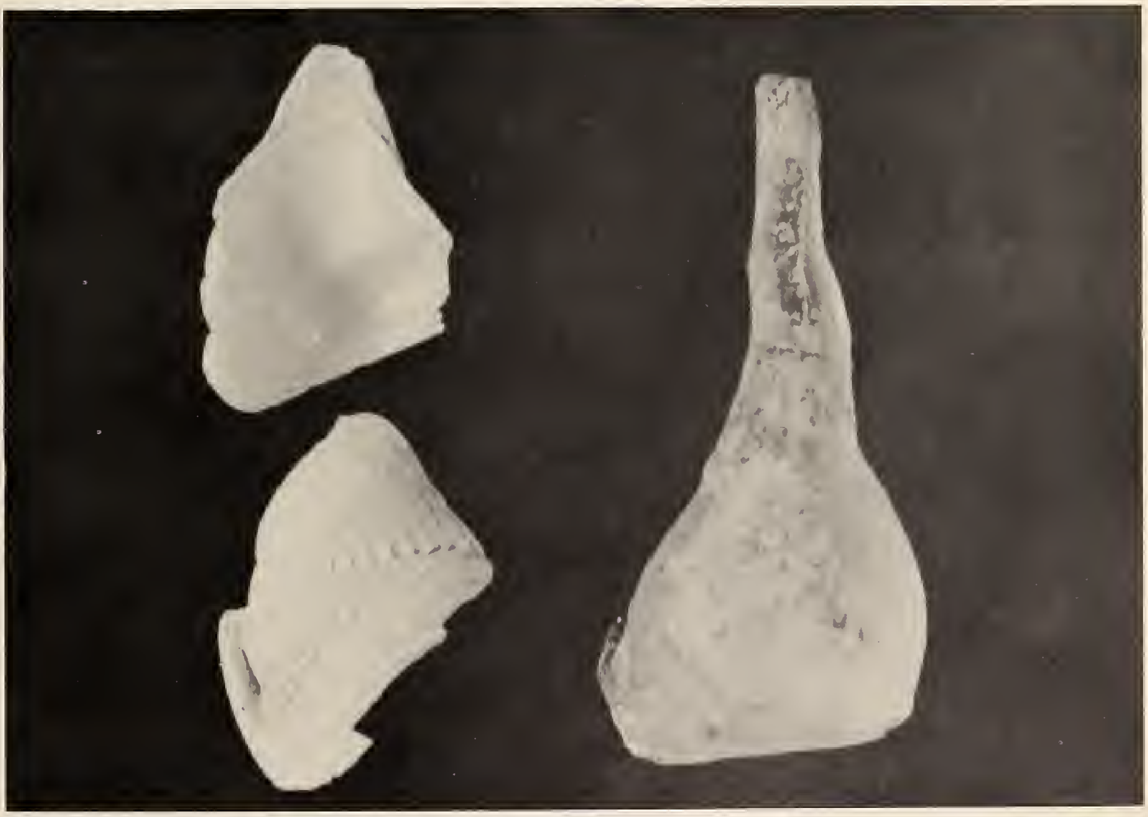

Figure 2

Scale $3\frac{1}{3}$: 1